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**HEALTH AND SAFETY PLAN  
FOR THE CALIFORNIA REGIONAL  
PM<sub>10</sub>/PM<sub>2.5</sub> AIR QUALITY STUDY (CRPAQS)**

**STI-999215-1894-HASP**

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## INTRODUCTION

The California Regional PM<sub>10</sub>/PM<sub>2.5</sub> Air Quality Study (CRPAQS) is a multi-year program of meteorological and air quality monitoring, emission inventory development, data analysis, and air quality simulation modeling. The objectives of CRPAQS are to (1) provide an improved understanding of emissions and the dynamic atmospheric processes that influence particle formation and distribution, (2) develop and demonstrate methods useful to decision makers in formulating and comparing candidate control strategies for attaining the federal and state PM<sub>10</sub>/PM<sub>2.5</sub> standards in central California, and (3) provide reliable means for estimating the impacts of control strategy options developed for PM<sub>10</sub>/PM<sub>2.5</sub> on visibility, air toxics, and acidic aerosols and on attainment strategies for other regulated pollutants, notably ozone.

Meeting these objectives requires an extensive, high-quality air quality and meteorological database. Air quality data for the study will be obtained during a 14-month field program from three kinds of sites: full-scale “anchor” monitoring sites measuring both gaseous and aerosol species; supplemental “satellite” sites measuring aerosol species using portable monitors; and a “backbone” network of existing California Air Resources Board (ARB) and air pollution control district sites. The purpose of this health and safety plan is to provide guidance for the safe conduct of employees during any CRPAQS field operation at any air quality anchor site operated by STI.

Providing a safe and healthful workplace for employees is the first consideration in the operation of business. It is both a moral obligation and sound business practice to prevent occupational injuries and illness. No phase of operations is more important than injury and illness prevention. Safety always takes precedence over expediency or shortcuts. As a condition of employment, each employee is expected to assume responsibility for working safely at all times. The following statement is, and shall be, the philosophy under which all CRPAQS field operations shall be performed:

### **SAFETY IS NOT A LUXURY; IT IS A MUST!**

This plan provides a set of general health and safety guidelines for use by all personnel, regardless of the component of the field operations in which they are participants, and some specific guidelines for the various field operations. This guidance is important during all field activities, including traveling to and from air quality monitoring sites and while at the sites. This health and safety plan shall not be considered a field plan or statement of operating procedures; but, rather, it serves to augment existing operations plans and manuals. This guide shall be followed by all employees responsible for the set-up, routine operations, quality assurance, and removal of air quality monitoring equipment.

As a member of the CRPAQS field operations team, each employee is expected to follow safe-practice rules, render every possible aid to safe operations, and report all unsafe conditions to appropriate supervisory personnel. Employees will be trained in the proper use of all equipment and be provided with applicable detailed health and safety guidance. Employees are expected to adhere to the health and safety guidelines provided by STI and by equipment manufacturers, as well as to use common sense under circumstances when no explicit guidelines

are available. All employees are expected to observe all local laws and regulations, including seat belt laws and posted speed limits.

## **Project Staff**

Field personnel should contact Dr. Beth Wittig, Field Operations Manager, (661) 203-1082, for all operational health and safety issues. If Dr. Wittig is unavailable, the management personnel at STI in Petaluma should be contacted. They can be reached by phone at (707) 665-9900.

## **Safety Operating Procedures**

### General

- Common sense should prevail at all times. All employees are responsible for safely carrying out assigned tasks so as to not endanger themselves or others around them. Field staff are also responsible for maintaining routine communication with the Field Operations Manager.
- Site work and driving will normally occur between 7 a.m. and 10 p.m. to allow the greatest possibility of obtaining help in an emergency. Work outside these hours is discouraged but may occasionally be conducted at the discretion of an individual employee in consultation with the Field Operations Manager.
- No eating or drinking is permitted within the monitoring site while handling any sampling media or working on electrical equipment.
- Smoking is prohibited within the shelter or within 50 feet of any site equipment. Any individual smoking in the vicinity of the site shall observe appropriate local precautions against grass fires and forest fires.
- Safety belts shall be worn in all vehicles. The belts should be completely secured before the vehicle is put into gear and moved for any distance.
- Injuries shall be reported immediately to the employee's direct supervisor, Field Operations Manager, and the Assistant Project Manager.
- Visitors to any site shall be directed to a safe distance from work being performed.

### Equipment and Supplies

- A first aid kit will be installed at each site shelter. Field personnel will routinely and regularly check the stock conditions of the first aid kit. Any deficiencies will be reported to the Field Operations Manager.
- A fire extinguisher will be installed at each site shelter.
- Emergency routes, telephone numbers of local authorities, and the location of the nearest medical facility shall be posted in a conspicuous place on-site.

## Personal Protective Equipment

It is the responsibility of each employee to have all safety equipment required during each field effort.

- **Safety Glasses** shall be worn while soldering, while using any power tools or striking tools (e.g., hammering), and during any other activity that may cause particles, liquids, or gases to be ejected from the work surface.
- **Hard Hats and Safety Glasses** shall be worn in the vicinity of any tower when any other personnel are climbing or working above head level.
- **Safety Shoes** shall be worn during any activity that may present a foot injury hazard (e.g., mowing, heavy equipment operation, or shelter placement).

## Severe Weather Issues

- It is likely that weather conditions may impact some field operations. Weather conditions, including severe wind and rain storms, and periods of poor visibility due to fog or high winds will be treated seriously. The overriding concern shall be the health and safety of the participant. Protection of equipment is secondary. Personnel located in the field shall be aware of weather conditions and forecasts at all times.
- No outdoor activity shall take place during lightning storms, hail storms, heavy rain, or any other weather condition that, in the opinion of an individual employee, represents an unreasonable hazard. Before arriving at each site, local conditions should be assessed to avoid danger from natural hazards.
- In the event of an emergency, employees shall take every precaution to protect sensitive equipment prior to evacuation. Precautionary measures, such as relocating portable electronic equipment or other gear vulnerable to weather damage to a protected area, is expected. Employees shall use common sense to determine the practicality of what equipment can be protected prior to evacuation. If possible, portable computers shall be relocated, and other equipment shall be covered and strapped down as tightly as possible.
- Employees are required to follow all safety instructions from local civil authorities and CRPAQS field and project managers. If ordered to do so, all personnel must leave. If employees must leave their post due to severe weather or must interrupt the normal operation of the measurements, the project manager shall be notified at the earliest opportunity and periodic contact shall be maintained.

## Electrical Hazards

- No eating or drinking is permitted in the vicinity of any piece of uncovered electrical equipment.
- Jewelry such as rings, watches, bracelets, and necklaces shall not be worn while working inside electrical equipment.
- Power supplies or other high voltage devices shall not be repaired in the field; they shall be replaced with the power source disconnected or the power shut off at the breaker in the electrical panel.

- When there is a chance that activation of an electrical circuit can produce physical harm or death, the device shall be labeled with such information.

### Tower Safety

- No tower shall be climbed or operated by a single person, unless a second person capable of acting as a safety backup is on-site and within sight and hearing distance.
- Individuals working above the ground shall secure themselves to the tower with a lifeline and safety harness or belt.
- The tower shall not be climbed when high winds are present, if ice has accumulated on the tower, or if an electrical storm is imminent.
- Tower activity should be restricted to daylight hours unless adequate lighting is provided for personnel working on the tower.
- All personnel shall remain at a safe distance away from towers when lightning is occurring in the vicinity.
- Specific instructions for operating the Angiola tower are included in Appendix A of this document.

### Other Issues

Air quality instruments (including towers, trailers, and computers) will be located on private property as well as government property, and employees are expected to treat this property and nearby residences with respect during the conduct of all work. Employees are expected to be familiar with the specific safety requirements related to individual sites. Employees are expected to be familiar with the safe operation of all equipment they are employed to operate and shall not operate equipment for which they have not received proper training.

## **Emergency Procedures**

### Medical Emergency

Employees shall initiate first aid and call "911" for emergency assistance.

As soon as possible, the injured employee's direct supervisor and the Field Operations Manager shall be notified.

### Emergency Information

Local emergency contacts and telephone numbers are posted at each site.

# **APPENDIX A**

## **Angiola Tower Operating Procedures**

Safety items used - Hard hats, gloves, ear plugs

Warnings - This procedure should not be performed in the rain. Area around tower should be clear of all items that might be tripped over. Two people are required! The procedure should be interrupted at 20m intervals to give the carriage motor a chance to rest for at least 1 minute. The procedure needs to be halted at the 50m enclosure for it to be disconnected from the carriage cable.

Operator assignment- Person 1 and 2 verbally interact. Both persons need to be participating in the procedure and communicating any issues.

Person 1 - operates carriage motor on/off switch

Person 2 - handles the carriage cable with tie-wrapped power/data cables and gas lines and draws it out into a 6 ft spool without stepping on it

1) Scissor lift pulled up to tower and area cleared of items that might be tripped over. Operator notes time tower lowered and times scissor lift is use in tower log.

Carriage lowering:

2) Person 1 waits for approval from Person 2 to begin. Once approval is given, this person watches the cable pull through motor system and stops the motor after 20m of cable has been drawn through the system. Motor is shut off prematurely if required by Person 2.

Person 2 grabs the cables and gives approval to begin. When power is initiated, this person spools the cable into 6ft circles, making sure that none of the tie-wrapped cables are caught on the tower appendages. Any problems or concerns which require the motor to be shut off are immediately communicated to Person 1.

3 ) Carriage motor cool-off for 1 - 10 minutes at 20m

4) Person 1 waits for approval from Person 2 to begin. Once approval is given, this person watches the cable pull through motor system and stops the motor after an additional 20m of cable has been drawn through the system. Motor is shut off prematurely if required by Person 2.

Person 2 grabs the cables and gives approval to begin. When power is initiated, this person spools the cable into 6ft circles, making sure that none of the tie-wrapped cables are caught on the tower appendages. Any problems or concerns which require the motor to be shut off are immediately communicated to Person 1.

5 ) Carriage motor cool-off for 1 - 10 minutes at 40m

6) Person 1 waits for approval from Person 2 to begin. Once approval is given, this person watches the cable pull through motor system and stops the motor <1" from where the 50m enclosure would be fully lowered. Motor is shut off prematurely if required by Person 2. Person 2 grabs the cables and gives approval to begin. When power is initiated, this person spools the cable into 6ft circles, making sure that none of the tie-wrapped cables are caught on the tower appendages. Any problems or concerns which require the motor to be shut off are immediately communicated to Person 1.

7) Carriage motor cool-off for 1 - 10 minutes at 50m during carriage release from carriage cable by Person 2. Carriage release requires the 5/32" bolts attaching the carriage to the cable to be loosened using a deep socket ratchet. When the carriage falls the remaining inch, the carriage is released.

8) Person 1 waits for approval from Person 2 to begin. Once approval is given, this person watches the cable pull through motor system and stops the motor at 60 and 80m for cool-off. Motor is shut off prematurely if required by Person 2. Person 2 grabs the cables above the 50m enclosure and gives approval to begin. When power is initiated, this person spools the cable into 6ft circles, making sure that none of the tie-wrapped cables are caught on the tower appendages. Any problems or concerns which require the motor to be shut off are immediately communicated to Person 1.

9) Carriage motor cool-off for 1 - 10 minutes at 60m and 80m during carriage release from carriage cable by Person 2.

10) Person 1 waits for approval from Person 2 to begin. Once approval is given, this person watches the cable pull through motor system and stops the motor < 1" from where the 95m enclosures would be fully lowered. Motor is shut off prematurely if required by Person 2. Person 2 grabs the cables above the 50m enclosure and gives approval to begin. When power is initiated, this person spools the cable into 6ft circles, making sure that none of the tie-wrapped cables are caught on the tower appendages. Any problems or concerns which require the motor to be shut off are immediately communicated to Person 1.

11) Tower operations: Require scissor lift. Cals using TS are done from ground. Gas cylinders (besides Nitrate NO) are all mounted on the ground. Operator notes issues with tower carriage system and when tower lowered and times scissor lift is use in tower log.

Carriage raising:

12) All operations items should be cleared from space. No calibration lines should still be connected. All enclosure doors should be fully closed.

13) Person 1 waits for approval from Person 2 to begin. Once approval is given, this person watches the cable pull through motor system and stops the motor after 20m and 40m of cable has been fed through system. Motor is shut off prematurely if required by Person 2. Person 2 grabs the cables and gives approval to begin. When power is initiated, this person lifts and feeds the cable to the tower, making sure that none of the tie-wrapped cables are caught on

the tower appendages and that there are no kinks in the cables. Any problems or concerns which require the motor to be shut off are immediately communicated to Person 1.

14) Carriage motor cool-off for 1 - 10 minutes at 20m and 40m.

15) Person 1 waits for approval from Person 2 to begin. Once approval is given, this person watches the cable pull through motor system and stops the motor when the cable is lined up to the 50m enclosure carriage rack. White spray-painted lines on the cable warn Person 1 10 ft in advance. Blue spray paint shows the proper alignment of the cable to the carriage rack. Motor is shut off prematurely if required by Person 2.

Person 2 grabs the cables and gives approval to begin. When power is initiated, this person lifts and feeds the cable to the tower, making sure that none of the tie-wrapped cables are caught on the tower appendages and that there are no kinks in the cables. Any problems or concerns which require the motor to be shut off are immediately communicated to Person 1.

16) Carriage motor cool-off for 1 - 10 minutes at 50m during carriage attachment to carriage cable by Person 2. Carriage attachment requires the 5/32" bolts attaching the carriage to the cable to be tightened using a deep socket ratchet. When the carriage moves with a short burst of power applied to the carriage cable, the carriage is fully attached.

17) Person 1 waits for approval from Person 2 to begin. Once approval is given, this person watches the cable pull through motor system and stops the motor after 60m and 80m of cable has been fed through system. Motor is shut off prematurely if required by Person 2.

Person 2 grabs the cables and gives approval to begin. When power is initiated, this person lifts and feeds the cable to the tower, making sure that none of the tie-wrapped cables are caught on the tower appendages and that there are no kinks in the cables. Any problems or concerns which require the motor to be shut off are immediately communicated to Person 1.

18) Carriage motor cool-off for 1 - 10 minutes at 60m and 80m.

19) Person 1 waits for approval from Person 2 to begin. Once approval is given, this person watches the cable pull through motor system and stops the motor when Person 1 says the cable is tight. Motor is shut off prematurely if required by Person 2.

Person 2 grabs the cables and gives approval to begin. When power is initiated, this person lifts and feeds the cable to the tower, making sure that none of the tie-wrapped cables are caught on the tower appendages and that there are no kinks in the cables. This person verbally counts down the cable tightness so Person 1 knows when to shut power to the system. It is important not to over-tighten the system!!! Any problems or concerns which require the motor to be shut off are immediately communicated to Person 1.

20) Scissor lift pulled away from tower. Operator notes time tower fully raised and times scissor lift were used in tower log.